



Agricultural Product Consumption Risk Assessment

**Donna J. Vorhees
Menzie-Cura & Associates, Inc.
and
George Fries**



Overview

- **Identify agricultural activities in the floodplain**
- **Estimate chemical concentrations in animal products and home garden produce**
- **Estimate human health risk associated with consuming food produced in the floodplain**



Agricultural activities in the floodplain - Pittsfield to CT border

COMMERCIAL ACTIVITY

Dairy farming

Fruit and vegetable growing

Free-range poultry farming

NON-COMMERCIAL ACTIVITY

Beef farming

Home gardening

Wild edible plant harvesting

Deer hunting



Exposure scenarios: consumption of plants

Source

Pathway

People

Air

Contaminated
floodplain soil



above ground plants



below ground plants



People
consuming
produce from
home
gardens

People
consuming
edible wild
plants



Exposure scenarios: consumption of animal products

Source

Pathway

People

Contaminated
floodplain soil



grazing &
ingestion of soil



corn silage and
grass-based feeds

dairy cattle
beef cattle
poultry
goats
sheep
deer

farm families
consuming
beef, dairy,
chicken and
eggs

hunting
families
consuming
venison



How were farms and gardens assessed?

- Assumed that
 - 100% of cultivation area is in floodplain
 - 100% of grazing area is in floodplain
- Estimated risk associated with two hypothetical PCB concentrations in soil (2 ppm and 0.5 ppm)
- Can extrapolate results to specific parcels:
Example: 100% and 2 ppm = 10% and 20 ppm



Estimating food concentrations: information from the floodplain

- **Corn**
- **Acorn Squash**
- **Fiddlehead Ferns**
- **Grass**
- **Milk**





Estimating concentrations in food: the math

- Home garden produce and animal feed

Soil-to-Plant Transfer Factor = $\frac{\text{concentration in plant}}{\text{concentration in soil}}$

- Animal products

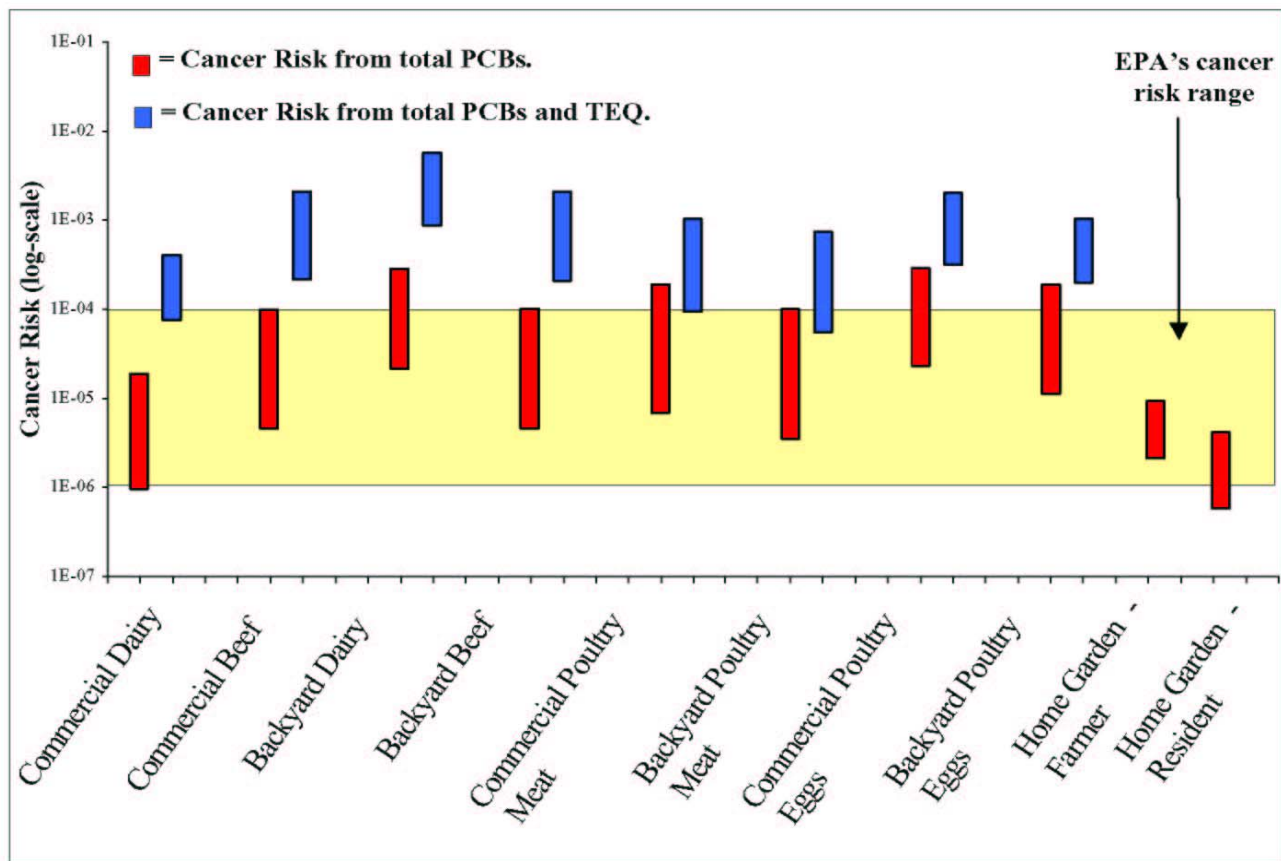
Bioconcentration Factor = $\frac{\text{concentration in meat, milk, or eggs}}{\text{concentration in food or soil}}$



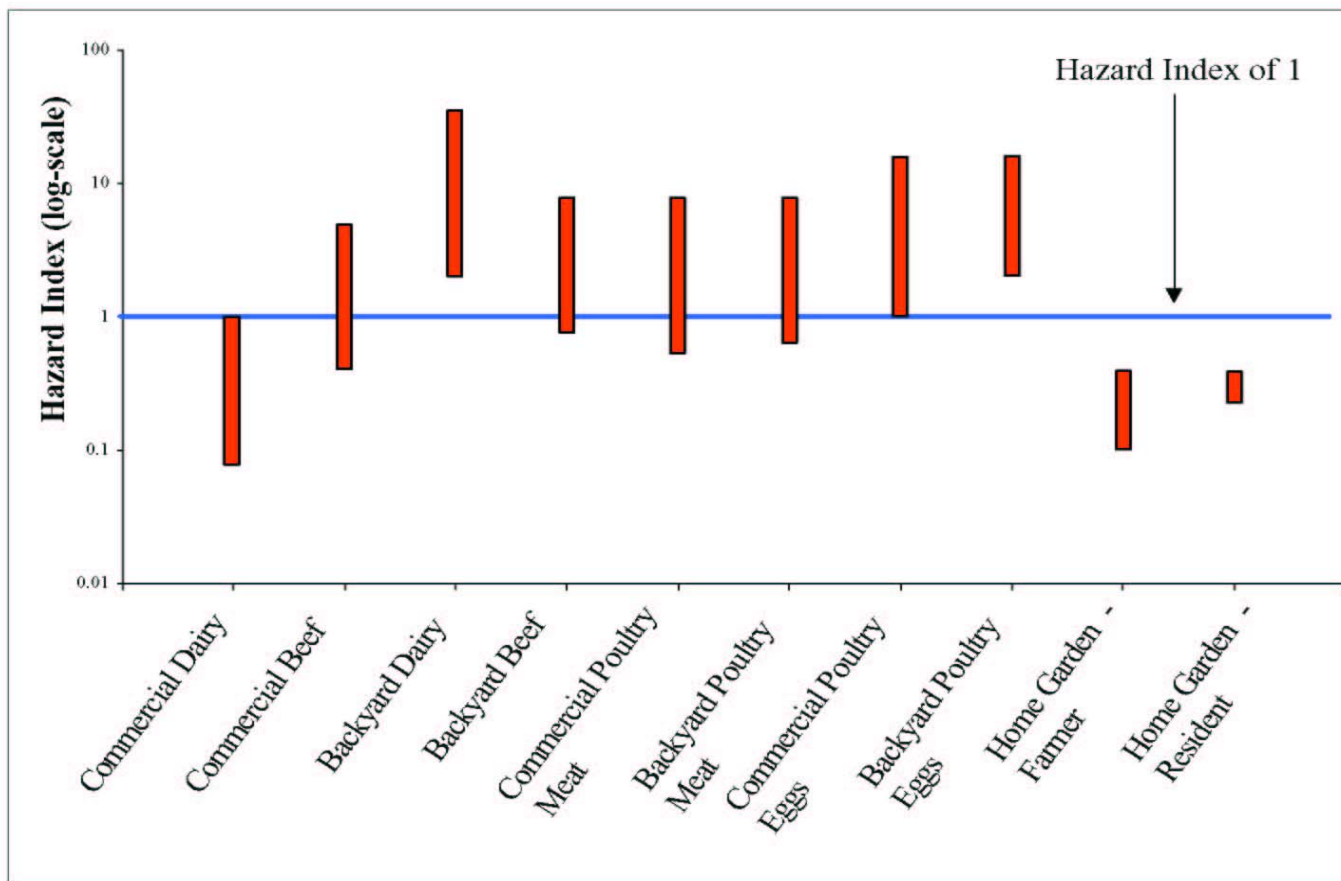
Estimating human exposure

- Food consumption rates
- Exposure duration
- Preparation and cooking methods

Summary of cancer risk estimates



Summary of hazard indices



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Predicted TEQ compared with measured TEQ in U.S. food supply

Commercial dairy

Assuming 0.5 mg/kg PCBs in soil:

- predicted TEQ is slightly less than the average TEQ in U.S. food supply

Assuming 2 mg/kg PCBs in soil:

- predicted TEQ is 2 times higher than average TEQ in U.S. food supply

